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**Measurement of radioactivity in the  
environment — Soil —**

Part 3:  
**Measurement of gamma-emitting  
radionuclides**

*Mesurage de la radioactivité dans l'environnement — Sol —  
Partie 3: Mesurages des radionucléides émetteurs gamma*



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Published in Switzerland

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18589-3 was prepared by Technical Committee ISO/TC 85, *Nuclear energy*, Subcommittee SC 2, *Radiation protection*.

ISO 18589 consists of the following parts, under the general title *Measurement of radioactivity in the environment — Soil*:

- *Part 1: General guidelines and definitions*
- *Part 2: Guidance for the selection of the sampling strategy, sampling and pre-treatment of samples*
- *Part 3: Measurement of gamma-emitting radionuclides*
- *Part 4: Measurement of plutonium isotopes (plutonium 238 and plutonium 239 + 240) by alpha spectrometry*
- *Part 5: Measurement of strontium 90*
- *Part 6: Measurement of gross alpha and gross beta activities*

## Introduction

This International Standard is published in several parts to be used jointly or separately according to needs. Parts 1 to 6, concerning the measurements of radioactivity in the soil, have been prepared simultaneously. These parts are complementary and are addressed to those responsible for determining the radioactivity present in soils. The first two parts are general in nature. Parts 3 to 5 deal with radionuclide-specific measurements and Part 6 with non-specific measurements of gross alpha or gross beta activities.

Additional parts may be added to ISO 18589 in the future if the standardization of the measurement of other radionuclides becomes necessary.

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# Measurement of radioactivity in the environment — Soil —

## Part 3:

## Measurement of gamma-emitting radionuclides

### 1 Scope

This part of ISO 18589 specifies the identification and the measurement of the activity in soils of a large number of gamma-emitting radionuclides using gamma spectrometry. This non-destructive method, applicable to large-volume samples (up to about 3 000 cm<sup>3</sup>), covers the determination in a single measurement of all the  $\gamma$ -emitters present for which the photon energy is between 5 keV and 3 MeV.

This part of ISO 18589 can be applied by test laboratories performing routine radioactivity measurements as a majority of radionuclides is characterized by gamma-ray emission between 40 keV and 2 MeV.

This part of ISO 18589 is suitable for the surveillance of the environment and the inspection of a site and allows, in case of accidents, a quick evaluation of gamma activity.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 31-9, *Quantities and units — Part 9: Atomic and nuclear physics*

ISO 10703, *Water quality — Determination of the activity concentration of radionuclides — Method by high resolution gamma-ray spectrometry*

ISO 11074, *Soil quality — Vocabulary*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

ISO 18589-1, *Measurement of radioactivity in the environment — Soil — Part 1: General guidelines and definitions*

ISO 18589-2, *Measurement of radioactivity in the environment — Soil — Part 2: Guidance for the selection of the sampling strategy, sampling and pre-treatment of samples*

*Guide to the expression of uncertainty in measurement (GUM)*, BIPM/IEC/IFCC/ISO/IUPAC/IUPAP/OIML